MONTANA COUNCIL OF TEACHERS OF MATHEMATICS
2011 MATH CONTEST

Dimensions and Shapes

DIRECTIONS: DO NOT WRITE ON THIS TEST. Place the best answer for each question on the separate answer sheet.

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1. What unit of measure would you use to measure the distance around a marble?
   a.) meters b.) kilometers c.) centimeters d.) hectometers

2. The side-lengths of quadrilateral ABCD are consecutive integers. If ABCD's perimeter is 8014, how long is ABCD's longest side?
   a.) 2002 b.) 2003 c.) 2004 d.) 2005

3. Every hour, the second hand of a circular clock moves a total of
   a.) 60° b.) 360° c.) 3600° d.) 21600°

4. If a small circle's diameter is a large circle's radius, then the small circle's area is what percent of the large circle's area.
   a.) 20% b.) 25% c.) 40% d.) 50%

5. A penny has a width of 19 mm. How many pennies, placed end to end, would fit in one meter?
   a.) 38 b.) 50 c.) 52 d.) 56

6. In 4 hours, through how many degrees does the hour hand of a circular clock move?
   a.) 1440° b.) 120° c.) 90° d.) 48°

7. One side of a rectangle is twice as long as another side. If all lengths are integers, the rectangle's perimeter could be
   a.) 26 b.) 27 c.) 36 d.) 44

8. JT sells a kilogram of fish bait for $1.90. How much would 600 grams of the bait cost?
   a.) $114 b.) $11.40 c.) $1.14 d.) $3.15

9. How many 12-inch square tiles are needed to tile the floor in a room that is 10 feet by 15 feet?
   a.) 150 b.) 300 c.) 144 d.) 1800

10. A *Norman Window* is in the shape of a rectangle topped by a semicircle. If the shorter side of the rectangle is 6 and the longer side is 8, the perimeter of the window could be…
    a.) $22 + 18\pi$ b.) $22 + 9\pi$ c.) $22 + 6\pi$ d.) $22 + 3\pi$

11. In a right triangle, if the length of the legs are 10 and 24, the length of the hypotenuse is
    a.) 17 b.) 26 c.) 34 d.) 38

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12. A pole that casts a 15-foot-long shadow stands near an eight-foot-high stop sign. If the shadow cast by the sign is three feet long, how high is the pole?
    a.) 40 feet b.) 30 feet c.) 24 feet d.) 45 feet

13. What is the volume of a cube that has a surface area of 150 cm^2
    a.) 100 cm^3 b.) 125 cm^3 c.) 150 cm^3 d.) 200 cm^3

14. Each of the following figures has exactly two pairs of parallel sides EXCEPT a
    a.) rhombus b.) parallelogram c.) trapezoid d.) square

15. The mass of a cookie is closest to:
    a.) 0.5 kg b.) 0.5 grams c.) 15 grams d.) 1.5 grams

16. The house plan called for pillars of width 9.625 inches. What would this be on a tape measure?
    a.) $9\frac{1}{8}$ in b.) $9\frac{1}{4}$ in c.) $9\frac{1}{2}$ in d.) $9\frac{5}{8}$ in

17. Two sides of a triangle have lengths 9 and 11. If no two sides of the triangle have equal lengths, the perimeter could be
    a.) 21 b.) 23 c.) 29 d.) 31

18. A square and an equilateral triangle have equal perimeters. The perimeter of the triangle is 12. Find the area of the square.
    a.) 9 b.) 16 c.) 36 d.) 81

19. Find the height of a box with surface area of 94 square feet with a width of 3 feet and a depth of 4 feet.
    a.) 3 ft b.) 4 ft c.) 5 ft d.) 6 ft

20. Patsy just inherited some oil-rich land in Wibaux county. She is given 60 miles of fence to enclose as much of the land as she can. It must be a rectangular enclosure. What is the largest area she can fence in to keep safe from the oil-bandits?
    a.) 200 mi^2 b.) 225 mi^2 c.) 900 mi^2 d.) 3600 mi^2

21. Find the volume of a box with a length of 8.5 inches, a width of 5.5 inches, and a height of 10 inches.
    a.) 457.6 in^3 b.) 476.5 in^3 c.) 467.5 in^3 d.) 475.6 in^3

22. Rectangle ABCD is similar to rectangle KLMN. AD = 15, AB = 19, KN = 6, what is the value of KL?
    a.) 7.6 b.) 10 c.) 9.3 d.) 11

23. What is the area of a triangle whose vertices have coordinates (1,1), (11,1), and (1,11)?
    a.) 50 b.) 60.5 c.) 100 d.) 121

Dimensions and Shapes 2011 - Answer Key

1.) *C*
2.) D
3.) D
4.) B
5.) *C*
6.) B
7.) *C*
8.) *C*
9.) *A*
10.) D
11.) B
12.) *A*
13.) B
14.) *C*
15.) *C*
16.) D
17.) B
18.) *A*
19.) *C*
20.) B
21.) *C*
22.) *A*
23.) *A*